

**ABSTRACT**

A method of estimating the spatial variation in RF signal intensity within magnetic resonance images of an object is described. The estimate can be used to provide enhanced contrast in a magnetic resonance image by correcting for spatial variation in RF intensities arising from non-uniformities in RF receiving coils of an MRI machine acquiring the image as well as distortions arising from the object and observation itself. This is achieved through compound imaging of a medium of essentially uniform spin density surrounding the object. From analysis of the surrounding medium, and the location of notional points of RF signal reception, a semi-empirical mathematical formulation of the decay profile of the RF signal intensity within the object is determined. This is then fitted to selected signal intensities from the medium surrounding the object to obtain an estimate of the spatial variation in RF signal intensity within the object.